

Preliminary Amendment -1-
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Frommer, et al.
§ 371 Patent Application of PCT/EP00/01397
filed August 17, 2001

WHAT IS CLAIMED IS:

- R126*
- 23*. An isolated and purified nucleic acid or fragment thereof that codes for a plant or animal nuclear base transporter comprising:
- a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;
 - b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;
 - c) a nucleic acid that hybridizes with a nucleic acid according to b);
 - d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);
 - e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases; or
 - f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);
- with the proviso that nucleic acids with a sequence according to one of the SEQ ID NO 3 to 5 are excluded.

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Rule 126 (a)

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~~24~~ 24. The nucleic acid according to Claim 1 that includes a coding sequence according to SEQ ID NO:1, 2, 6, 7, or 10, or a derivative of a coding sequence according to SEQ ID NO:1, 2, 6, 7, or 10 derived through substitution, addition, inversion and/or deletion of one or more bases.

~~25~~ 25. The nucleic acid according to one of the Claim 1, wherein said nucleic acid is a DNA.

~~26~~ 26. A fragment of a nucleic acid that codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

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e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);

with the proviso that nucleic acids with a sequence according to one of the SEQ ID NO 3 to 5 are excluded,

wherein said fragment is characterized in that in anti-sense orientation to a promoter it can inhibit the expression of a nuclear base transporter in a host cell.

~~27~~ 5. The nucleic acid fragment according to Claim 4, that includes at least 10 nucleotides.

~~28~~ 6. A construct comprising the sequence of at least a portion of an isolated and purified nucleic acid that codes for a plant or animal nuclear base transporter that itself comprises:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

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c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);

with the proviso that nucleic acids with a sequence according to one of the SEQ ID NO 3 to 5 are excluded,

wherein said nucleic acid is under the control of an element regulating expression.

29. The construct according to Claim 6, that is in anti-sense orientation to the regulatory element.

30. The construct according to Claim 6 that is available in a plasmid.

31. A host cell comprising a nucleic acid or fragment thereof that codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-

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deficient host cells with a plant or animal gene bank
and selection of nuclear base transporter-positive
host cells;

b) a nucleic acid with a sequence that
codes for a protein having a sequence according to
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a
nucleic acid according to b);

d) a nucleic acid that, in consideration of
degeneration of the genetic code, would hybridize
with a nucleic acid according to b) or with the
sequence complementary to b);

e) a derivative of a nucleic acid according
to a) to d) obtained through substitution, addition,
inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a
nucleic acid according to one of the groups a) to e);

with the proviso that nucleic acids with a
sequence according to one of the SEQ ID NO 3 to 5 are
excluded.

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10. The host cell according to Claim 9 that
is selected from bacteria, yeast cells, mamalian
cells and plant cells.

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11. A transgenic plant, transgenic plant
part, seed of the transgenic plant or host cell that
comprises a nucleic acid or fragment thereof that

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codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);

with the proviso that nucleic acids with a sequence according to one of the SEQ ID NO 3 to 5 are excluded.

12. The transgenic plant, part of the transgenic plant, seed or host cell according to Claim 11, wherein said nucleic acid or fragment is

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integrated into a site on the genome that does not
correspond to its natural position.

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13. A protein obtainable through
expression in a host cell of a nucleic acid according
to Claim 1 or a nucleic acid having a sequence
selected from the group consisting of SEQ ID NO:3,
SEQ ID NO:4 and SEQ ID NO:5.

~~36~~
14. An antibody that reacts with a protein
obtainable through expression in a host cell of a
nucleic acid or fragment thereof that codes for a
plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable
through complementation of nuclear base transporter-
deficient host cells with a plant or animal gene bank
and selection of nuclear base transporter-positive
host cells;

b) a nucleic acid with a sequence that
codes for a protein having a sequence according to
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a
nucleic acid according to b);

d) a nucleic acid that, in consideration of
degeneration of the genetic code, would hybridize
with a nucleic acid according to b) or with the
sequence complementary to b);

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e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);
or

g) a nucleic acid having a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

~~37~~
15. A process for the manufacture of a transgenic plant comprising the following steps:

A. inserting a nucleic acid or fragment thereof that codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

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e) a derivative of a nucleic acid
according to a) to d) obtained through
substitution, addition, inversion and/or
deletion of one or more bases;

f) a nucleic acid complementary to a
nucleic acid according to one of the groups a)
to e); or

g) a nucleic acid with a sequence
selected from the group consisting of SEQ ID
NO:3, SEQ ID NO:4 and SEQ ID NO:5

in a plant cell to make a transformed plant
cell; and

B. regenerating a plant from the
transformed plant cell.

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16. A process for influencing the nuclear
base transporter properties of a plant, part of a
plant or of seeds, comprising inserting into a plant
cell or plant a nucleic acid or fragment thereof that
codes for a plant or animal nuclear base transporter
comprising:

a) a nucleic acid that is obtainable
through complementation of nuclear base transporter-
deficient host cells with a plant or animal gene bank
and selection of nuclear base transporter-positive
host cells;

b) a nucleic acid with a sequence that
codes for a protein having a sequence according to
SEQ ID NO:8 or SEQ ID NO:9;

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c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);
or

g) a nucleic acid with a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

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14. A use of plant cells for the regeneration and manufacture of entire plants, wherein said plant cells comprise a nucleic acid or fragment thereof that codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

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b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);

with the proviso that nucleic acids with a sequence according to one of the SEQ ID NO 3 to 5 are excluded.

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~~17~~ 18. A use of a nucleic acid or fragment thereof for the isolation of homologous sequences from bacteria, fungi, plants, animals or human beings, wherein said nucleic acid or fragment thereof codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);
or

g) a nucleic acid with a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

~~44~~ 15. A use of a nucleic acid or fragment thereof for the expression of a nuclear base transporter in prokaryotic and/or eukaryotic cells, wherein said nucleic acid or fragment thereof codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank

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and selection of nuclear base transporter-positive
host cells;

b) a nucleic acid with a sequence that
codes for a protein having a sequence according to
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a
nucleic acid according to b);

d) a nucleic acid that, in consideration of
degeneration of the genetic code, would hybridize
with a nucleic acid according to b) or with the
sequence complementary to b);

e) a derivative of a nucleic acid according
to a) to d) obtained through substitution, addition,
inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a
nucleic acid according to one of the groups a) to e);
or

g) a nucleic acid with a sequence selected
from the group consisting of SEQ ID NO:3, SEQ ID NO:4
and SEQ ID NO:5.

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20. Use of a nucleic acid or fragment
thereof under the control of a regulatory element in
anti-sense orientation for the inhibition of the
expression of an endogenous nuclear base transporter
in prokaryotic or eukaryotic cells, wherein said
nucleic acid or fragment thereof codes for a plant or
animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);
or

g) a nucleic acid with a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

21. A use of a nucleic acid or fragment thereof for the manufacture of useful transgenic plants, wherein said nucleic acid or fragment thereof codes for a plant or animal nuclear base transporter comprising:

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a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);
or

g) a nucleic acid with a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

~~44~~
~~52~~. A use of a nucleic acid for the identification of inhibitors of nuclear base transport, wherein said nucleic acid or fragment thereof codes for a plant or animal nuclear base transporter comprising:

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a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);
or

g) a nucleic acid with a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

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~~23~~. The nucleic acid fragment according to Claim 4 that includes at least 50 nucleotides.

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~~24~~. The nucleic acid fragment according to Claim 4 that includes at least 200 nucleotides.

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35. The construct according to Claim 6 wherein said nucleic acid is a fragment characterized in that in anti-sense orientation to a promoter it can inhibit the expression of a nuclear base transporter in a host cell.

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36. The construct according to Claim 7 that is available in a plasmid.

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37. The nucleic acid according to Claim 2 that is a DNA.

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38. The nucleic acid fragment according to Claim 4 the sequence of which includes a portion of coding sequence according to SEQ ID NO:1, 2, 6, 7, or 10, or a derivative of a coding sequence according to SEQ ID NO:1, 2, 6, 7, or 10 derived through substitution, addition, inversion and/or deletion of one or more bases.

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39. The host cell according to Claim 9 that comprises or further comprises a nucleic acid with a sequence according to one of the SEQ ID NO 3 to 5.

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30. The host cell according to Claim 9 that comprises or further comprises a recited nucleic acid fragment.

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~~31~~ 31. The host cell according to Claim 9
that comprises or further comprises a construct
having a recited nucleic acid or nucleic acid
fragment under the control of an element regulating
expression.

~~32~~ 32. The transgenic plant, transgenic plant
part, seed or host cell according to Claim 11 that
comprises or further comprises a nucleic acid having
a sequence selected from the group consisting of SEQ
ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

~~33~~ 33. The transgenic plant, transgenic plant
part, seed or host cell according to Claim 11 that
comprises or further comprises a fragment of said
nucleic acid.

~~34~~ 34. The transgenic plant, transgenic plant
part, seed or host cell according to Claim 11 that
comprises or further comprises a construct having
said nucleic acid sequence under the control of an
element regulating expression.

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